

Appendix D. Intalco SO₂ Agreed Order 21310

**STATE OF WASHINGTON
DEPARTMENT OF ECOLOGY**

IN THE MATTER OF AN AGREED ORDER
CONCERNING
INTALCO ALUMINUM LLC

AGREED ORDER
DOCKET NO. 21310

To:

Robert S. Bear
Intalco Aluminum LLC
4050 Mountain View Road
Ferndale, WA 98248 USA

I. INTRODUCTION

This is an Agreed Order (Order) between the Department of Ecology (Ecology) and the owner and operator of the Intalco aluminum facility, Intalco Aluminum LLC. The objective of this Order is to set forth terms and conditions applicable to the Intalco facility in order for the State of Washington to achieve compliance with the one-hour State and National Ambient Air Quality Standards (NAAQS) for sulfur dioxide (SO₂) in the vicinity of the Intalco facility, as shown in Exhibit A.

The terms and conditions set forth in this Order will be incorporated into Ecology's State Implementation Plan (SIP) and the Intalco facility's Air Operating Permit (AOP).

II. RECOGNITION OF ECOLOGY'S JURISDICTION

This Order is issued pursuant to the authority vested in Ecology by the Federal Clean Air Act (FCAA), 42 U.S.C. §§ 7401–7675, the Washington Clean Air Act (WCAA), Revised Code of Washington (RCW) 70A.15, and regulations issued under the FCAA and WCAA.

RCW 70A.15.2040(3), in conjunction with RCW 70A.15.3000(1), authorizes Ecology to issue administrative orders "as necessary to effectuate the purposes of the act" and to enforce those orders.

As the owner and operator of the Intalco facility, Intalco Aluminum LLC agrees to undertake all actions required of it by the terms and conditions of this Order, and not to contest Ecology's jurisdiction and authority to administer this Order.

Nothing in this Order shall in any way relieve Intalco Aluminum LLC and/or its successor(s) in interest (hereafter referred to as "Intalco") of its obligations to comply with the requirements of Intalco's Air Operating Permit (AOP) or any other requirements of the law. Nor shall anything in this Order limit Ecology's authority to enforce the provisions of the aforementioned AOP or any other requirements of the FCAA or WCAA.

III. FINDINGS OF FACT

Intalco Aluminum LLC, a subsidiary of Alcoa Corporation, is the current owner and operator of a primary aluminum smelter located in Whatcom County, Washington, within the Cherry Point area, an area zoned for heavy industrial use. Pursuant to 42 U.S.C. § 7401–7675, air monitoring began in the Cherry Point area and the first three years of data were analyzed to ascertain whether portions of ambient air within the Cherry Point area exceeded the NAAQS for one-hour SO₂. This NAAQS is attained when the three-year average of the annual 99th percentile of daily maximum one-hour average concentrations of SO₂ does not exceed 75 parts per billion (ppb). This monitoring program began January 1, 2017. During the first three years, the two monitors measured a total of 45 hours greater than 75 ppb. This represented 0.17% of the time during the period analyzed.

On April 22, 2020, Alcoa Corporation announced its decision to curtail operations at the Intalco facility. All of the production processes at the Intalco facility were curtailed by the end of August 2020. Although the curtailment is not considered a permanent closure of the facility, as of the date of this Order, Intalco has not scheduled a restart date.

On December 21, 2020, the United States Environmental Protection Agency (EPA) designated a portion of Whatcom County, as shown in Exhibit A, as being in nonattainment of the one-hour SO₂ NAAQS. The nonattainment designation was effective on April 30, 2021. Pursuant to 42 U.S.C. § 7502(a)(2), the area is required to be back in attainment within five years of the designation effective date.

Intalco's SO₂ emissions were the basis for EPA's designation of the nonattainment area. For the purpose of returning the area to attainment, Ecology is requiring Intalco to install and operate an SO₂ Emissions Control System (as defined in Section V.1.a below), limit the facility's total SO₂ emissions, and limit SO₂ emissions from a number of the facility's individual emission units. These required actions are collectively referred to as "Intalco's Attainment Strategy."

Nothing in this Order shall restrict the Facility Owner from either installing and operating additional emission control systems or further reducing SO₂ emissions for any unit(s) below the limits set forth in this Order. Any additional actions that may need to be taken for purposes of compliance with the FCAA or WCAA will be addressed outside of this Order.

IV. EMISSION LIMITS

For the reasons set forth in Section III above, and in accordance with RCW 70A.15.2040, it is agreed that the following new emission limits will apply to Intalco effective April 30, 2025, with the exception of the facility-wide SO₂ emissions limit set forth in Section IV.1.a., below, which will be effective upon restart of any potline operations.

The establishment of these new emission limits shall not in any way relieve Intalco of the obligation to comply with other applicable emission limits, including the monthly limits on SO₂ emissions from the potlines set forth in Intalco's AOP.

1. Facility-Wide Emission Limit

- a. Intalco will limit facility-wide SO₂ emissions at or below 5,000 tons per calendar year upon restart of any potline operations.
 - i. If operation of the SO₂ Emissions Control System required by Section V.1 is not sufficient to maintain facility-wide SO₂ emissions at or below 5,000 tons per year, Intalco will take additional action as necessary to comply with this facility-wide emission limit through any of the following measures, or a combination thereof:
 1. Limiting production; and/or
 2. Establishing new operating limits for sulfur content in calcined petroleum coke/pitch/green anodes; and/or
 3. Installing an additional wet scrubber on a center; and/or
 4. Installing new technologies if or when viable.
 - ii. If Intalco takes additional actions beyond those listed in Section IV.1.a.i to comply with the facility-wide SO₂ emissions limit set forth in Section IV.1.a, Intalco will notify Ecology in writing prior to implementation of such measure(s).

2. Unit-Specific Emission Limits – Operating Scenario 1 (Center 1 SO₂ Wet Scrubber operating)

Table 1: Operating Scenario 1 Emission Limits

Condition	Emission Unit (EU)	Parameter	Emission Limit
IV.2.a	Bake Oven Scrubber (EU 187)	SO ₂	117.5 pounds per hour (lb/hr)
IV.2.b	Potline A, Primary Emission Control System, Center 1 (EU 181)	SO ₂	70 lb/hr
IV.2.c	Potline A, Primary Emission Control System, Center 2 (EU 182)	SO ₂	320 lb/hr ^[1]
IV.2.d	Potline B, Primary Emission Control System, Center 3 (EU 183)	SO ₂	320 lb/hr ^[1]
IV.2.e	Potline B, Primary Emission Control System, Center 4 (EU 184)	SO ₂	320 lb/hr ^[1]
IV.2.f	Potline C, Primary Emission Control System, Center 5 (EU 185)	SO ₂	320 lb/hr ^[1]
IV.2.g	Potline C, Primary Emission Control System, Center 6 (EU 186)	SO ₂	320 lb/hr ^[1]
IV.2.h	Casthouse Units (EUs 4, 5, 7, 8, 10, 11, 13, 14, 16–19, 217, and 314)	SO ₂	0.7 lb/hr ^[2]

¹ A single Center (Centers 2–6) may be greater than the specified emission limit only if the hourly emission rate from that Center does not exceed 400 pounds per hour and all other Centers have an hourly emission rate below the specified emission limit.

² Casthouse Units include Holding Furnaces 1–12, the Remelt Furnace, and the Homogenization Furnace. The specified emission limit is the sum of hourly emissions from each of the specified emission units.

3. Unit-Specific Emission Limits – Operating Scenario 2 (Center 1 SO₂ Wet Scrubber not operating³)

Table 2: Operating Scenario 2 Emission Limits

Condition	Emission Unit (EU)	Parameter	Emission Limit
IV.3.a	Bake Oven Scrubber (EU 187)	SO ₂	117.5 pounds per hour (lb/hr)
IV.3.b	Potline A, Primary Emission Control System, Center 1 (EU 181)	SO ₂	280 lb/hr ^[4]
IV.3.c	Potline A, Primary Emission Control System, Center 2 (EU 182)	SO ₂	280 lb/hr ^[5]
IV.3.d	Potline B, Primary Emission Control System, Center 3 (EU 183)	SO ₂	280 lb/hr ^[5]
IV.3.e	Potline B, Primary Emission Control System, Center 4 (EU 184)	SO ₂	280 lb/hr ^[5]
IV.3.f	Potline C, Primary Emission Control System, Center 5 (EU 185)	SO ₂	280 lb/hr ^[5]
IV.3.g	Potline C, Primary Emission Control System, Center 6 (EU 186)	SO ₂	280 lb/hr ^[5]
IV.3.h	Casthouse Units (EUs 4, 5, 7, 8, 10, 11, 13, 14, 16–19, 217, and 314)	SO ₂	0.7 lb/hr ^[2]

V. ACTIONS

For the reasons detailed above, and in accordance with RCW 70A.15.2040, it is agreed Intalco shall take the actions set forth below. Intalco shall also submit required permit applications and documents to all relevant government agencies for any approvals necessary to meet the schedule for installation and operation of the SO₂ Emissions Control System set forth below and other actions necessary to maintain emissions below the 5,000 tons per year SO₂ emissions cap and the unit-specific emissions limits set forth in Section IV.

1. Installation and Operation of an SO₂ Emissions Control System.

- a. Intalco shall install and operate one new SO₂ wet scrubber on Center 1, as shown in Exhibit B. As part of this facility upgrade, and in order to reduce downwash, Intalco shall also increase stack heights of potline emission control Centers 1, 2, 3, 4, 5, and 6, and the Bake Oven Scrubber. The new stacks shall include sampling platforms and ports to allow for stack testing. The new stacks shall be raised and merged as necessary to reduce downwash, in accordance

³ These emission limits apply during periods when the scrubber is not operating due to maintenance, repair, or malfunction.

⁴ Hourly emissions from Center 1 may be greater than the specified emission limit only if the hourly emission rate from Center 1 does not exceed 350 pounds per hour and all other Centers have an hourly emission rate below the specified emission limit.

⁵ A single Center (Centers 2–6) may be greater than the specified emission limit only if the hourly emission rate does not exceed 400 pounds per hour and all other Centers have an hourly emission rate below the specified emission limit.

with the June 24, 2022 ambient air modeling report approved by Ecology. The new stacks will be raised to a minimum height of 45 meters, but not to exceed (for dispersion modeling credit) Good Engineering Practice (GEP) stack height as defined in WAC 173-400-200(2)(a)(ii).

The new wet scrubber and the merged and raised stacks (for Centers 1–6 and the Bake Oven Scrubber) are collectively referred to as the “SO₂ Emissions Control System” throughout this Order.

- b. The SO₂ Emissions Control System must be installed and operational as follows:
 - i. **If the facility restarts any potline operations on or before April 30, 2025:**
 1. The SO₂ Emissions Control System must be installed and operational by April 30, 2025. If the facility restarts any potline operations on or before April 30, 2025, without the SO₂ Emissions Control System installed and operational by April 30, 2025, the facility must cease all potline operations on that date and remain in curtailment until the SO₂ Emissions Control System is installed and operational.
 2. Notwithstanding the foregoing, if the facility restarts potline operations on or before April 30, 2025, and Intalco elects to keep a portion of a potline that would exhaust to a single center (excluding Center 1) curtailed and/or out of production, the associated stacks need not be raised and merged prior to restart of other potline operations, but must be raised and merged prior to restart of the curtailed potline.
 - ii. **If the facility’s potline operations remain curtailed on April 30, 2025:**
 1. The SO₂ Emissions Control System must be installed and operational prior to the restart of any potline operations.
 2. Notwithstanding the foregoing, if the facility restarts potline operations after April 30, 2025, and Intalco elects to keep a portion of a potline that would exhaust to a single center (excluding Center 1) curtailed and/or out of production, the associated stacks need not be raised and merged prior to restart of other potline operations, but must be raised and merged prior to restart of the curtailed potline.
 - c. Intalco shall submit a Notice of Construction (NOC) application to Ecology for the installation of the SO₂ Emissions Control System. The NOC application must include design information and engineering reports for the new SO₂ wet scrubber and the stack modifications for Centers 1 through 6 and the Bake Oven Stack.
2. **Monitoring, Recordkeeping, and Reporting.**
- a. Bake Oven Scrubber (EU 187)

- i. Intalco must conduct quarterly stack testing of at least three runs at the Bake Oven Scrubber (EU 187) to determine compliance with the SO₂ emission limits set forth in Sections IV.2.a and IV.3.a. Stack tests must be conducted at or above representative operating conditions for the quarter. Stack testing is not required for any quarter during which the source is curtailed.
 - ii. Alternatively, Intalco may install a continuous monitoring system (CMS) on the Bake Oven Scrubber (EU 187) to determine compliance with the SO₂ emission limits set forth in Sections IV.2.a and IV.3.a. The CMS must be properly maintained and operated in accordance with WAC 173-400-105(7) and all applicable performance specifications in Appendix B of 40 C.F.R. Part 60 and quality assurance procedures in Appendix F of 40 C.F.R. Part 60. Intalco must calculate the hourly average SO₂ emissions from the Bake Oven Scrubber using the CMS data.
 - b. Potlines Primary Emissions Controls Systems, Centers 1–6 (EUs 181–186)
 - i. Intalco must conduct quarterly stack testing of at least three runs at each of the center stacks associated with the Potlines Primary Emissions Control Systems, Centers 1–6 (EUs 181–186) to determine compliance with the SO₂ emission limits set forth in Sections IV.2.b–g and IV.3.b–g. Stack tests must be conducted at or above representative operating conditions for the quarter. Stack testing is not required for any quarter during which the source is curtailed.
 - ii. Alternatively, Intalco may install a CMS on each of the center stacks associated with the Potlines Primary Emissions Control Systems, Centers 1–6 (EUs 181–186) to determine compliance with the SO₂ emission limits set forth in Sections IV.2.b–g and IV.3.b–g. The CMS must be properly maintained and operated in accordance with WAC 173-400-105(7) and all applicable performance specifications in Appendix B of 40 C.F.R. Part 60 and quality assurance procedures in Appendix F of 40 C.F.R. Part 60. Intalco must calculate the hourly average SO₂ emissions from each stack for Centers 1–6 using the CMS data.
 - c. Intalco must calculate the SO₂ emission rate from the Casthouse Units in accordance with Equation 11 in Exhibit C. Intalco must report the maximum hourly SO₂ emission rate from the Casthouse Units calculated for the reporting period in the monthly air report submitted to Ecology.
 - d. For purposes of demonstrating compliance with the facility-wide SO₂ emissions limit set forth in Section IV.1.a, Intalco shall calculate and report total facility-wide SO₂ emissions in accordance with Intalco's AOP and as provided in Sections V.2.d.i–iv, below.
 - i. Intalco must report its facility-wide SO₂ emissions, in tons per month and for year-to-date for the calendar year, to Ecology on a monthly basis.

- ii. Prior to installation of the SO₂ wet scrubber, Intalco must use the existing equations specified in the AOP to calculate monthly SO₂ emissions.
 - iii. Following installation of the SO₂ wet scrubber, Intalco must use the equations included in Exhibit C to calculate monthly SO₂ emissions, except as provided in Section V.2.d.iv.
 - iv. If Intalco chooses to install a CMS at the Bake Oven Scrubber (EU 187) or the Potlines Primary Emissions Control Systems, Centers 1–6 (EUs 181–186), the monthly SO₂ emissions must be calculated using the average hourly CMS data for the respective unit(s) combined with the equations in Exhibit C for units without CMS data, unless otherwise approved in writing by Ecology.
- e. Intalco shall notify Ecology prior to any planned curtailment of the entire portion of Potline A (north end) that exhausts to Center 1.

3. Additional Requirements and Provisions.

- a. Intalco will notify Ecology upon completion of the SO₂ Emissions Control System installation. Ecology may perform an inspection to confirm the SO₂ Emissions Control System meets all requirements set forth in the applicable NOC approval order.
- b. In addition to the NOC application required by Section V.1.c, Intalco will submit timely applications for any other required permits, permit modifications, or other regulatory approvals⁶ in order to:
 - i. Install and operate the SO₂ Emissions Control System as required by Section V.1.a–b; and
 - ii. Implement any of the measures set forth in Section IV.1.a.i in order to comply with the facility-wide SO₂ emissions limit, as applicable.

VI. EFFECTIVE DATE

This Order is effective on the date signed by both parties.

VII. FAILURE TO COMPLY

Per RCW 70A.15.2040(3), RCW 70A.15.3000(1), and RCW 70A.15.3160, failure to comply with any of the provisions of this Order may subject Intalco to enforcement action by Ecology, including the issuance of civil penalties of up to \$10,000 per day per violation.

⁶ This may include Notice of Construction (NOC) approval orders, National Pollutant Discharge Elimination System (NPDES) permits, and Site-Specific Monitoring Plan modifications.

VIII. THIRD PARTY RIGHT TO APPEAL

By signing this Order, Intalco has agreed to not appeal this Order. A third party other than Intalco may appeal this Order to the Pollution Control Hearings Board (PCHB) within 30 days of the date of receipt. The appeal process is governed by RCW 43.21B and WAC 371-08. "Date of receipt" is defined in RCW 43.21B.001(2). More information is available at eluhwa.gov.

To appeal this Order, a party must do all of the following within 30 days of the date of receipt of this Order:

- File the appeal and a copy of this Order with the PCHB (see filing options below). "Filing" means actual receipt by the PCHB during regular business hours as defined in WAC 371-08-305 and -335. "Notice of appeal" is defined in WAC 371-08-340.
- Serve a copy of the appeal and this Order on Ecology in paper form, by mail or in person (see addresses below.) E-mail is not accepted.

An appealing party must also comply with other applicable requirements in RCW 43.21B and WAC 371-08.

An appeal alone will not stay the effectiveness of this Order. Stay requests must be submitted in accordance with RCW 43.21B.320.

FILING AN APPEAL WITH THE PCHB

For the most current information regarding filing with the PCHB, visit: eluhwa.gov/content/11

Filing by mail

Mailing Address:

Pollution Control Hearings Board
PO Box 40903
Olympia, WA 98504-0903

Filing in person (or by certified mail/courier)

Street Address:

Pollution Control Hearings Board
1111 Israel RD SW
STE 301
Tumwater, WA 98501

Filing electronically

Email address:

pchb-shbappeals@eluhwa.gov

SERVING A COPY OF THE APPEAL ON ECOLOGY

Electronic copies of appeals are not accepted at the Department of Ecology per WAC 371-08-305(10).

Filing by mail

Mailing Address:

Department of Ecology
Attn: Appeals Processing Desk
PO Box 47608
Olympia, WA 98504-7608

Filing in person (or by certified mail/courier)

Street Address:

Department of Ecology
Attn: Appeals Processing Desk
300 Desmond Drive SE
Lacey, WA 98503

IX. CONTACT INFORMATION

Please direct all questions about this Order to:


James DeMay
Department of Ecology
Industrial Section
PO Box 47600
Olympia, WA 98504-7600

Phone: 360-407-6868
Email: james.demay@ecy.wa.gov

X. MORE INFORMATION

- **Pollution Control Hearings Board Website**
<https://eluh0.wa.gov/> or <https://eluh0.wa.gov/content/11>
- **RCW 43.21B – Environmental and Land Use Hearings Office – Pollution Control Hearings Board**
<https://apps.leg.wa.gov/RCW/default.aspx?cite=43.21B>
- **WAC 371-08 – Practice and Procedure**
<https://apps.leg.wa.gov/WAC/default.aspx?cite=371-08>
- **RCW 34.05 – Administrative Procedure Act**
<https://apps.leg.wa.gov/RCW/default.aspx?cite=34.05>
- **Laws and Rules**
<https://leg.wa.gov/LawsAndAgencyRules/Pages/default.aspx>


XI. SIGNATURES



James DeMay, P.E.
Industrial Section Manager
Department of Ecology

11/09/22

Date



Robert S. Bear
President
Intalco Aluminum LLC

11-08-22

Date

EXHIBIT A

WHATCOM COUNTY NONATTAINMENT AREA

Pursuant to 86 Fed. Reg. 16055, 16073 (Mar. 26, 2021), the U.S. Environmental Protection Agency designated the following portion of Whatcom County, Washington, as a Nonattainment Area for failure to meet the 2010 Primary National Ambient Air Quality Standard for Sulfur Dioxide (2010 SO₂ NAAQS):

That portion of Whatcom County encompassed by the rectangle with the vertices using Universal Traverse Mercator (UTM) coordinates in UTM zone 10 with datum NAD83 as follows:

- (1) Vertices—UTM Easting (m) 519671, UTM Northing (m) 5412272;
- (2) Vertices—UTM Easting (m) 524091, UTM Northing (m) 5412261;
- (3) Vertices—UTM Easting (m) 519671, UTM Northing (m) 5409010;
- (4) Vertices—UTM Easting (m) 524111, UTM Northing (m) 5409044.

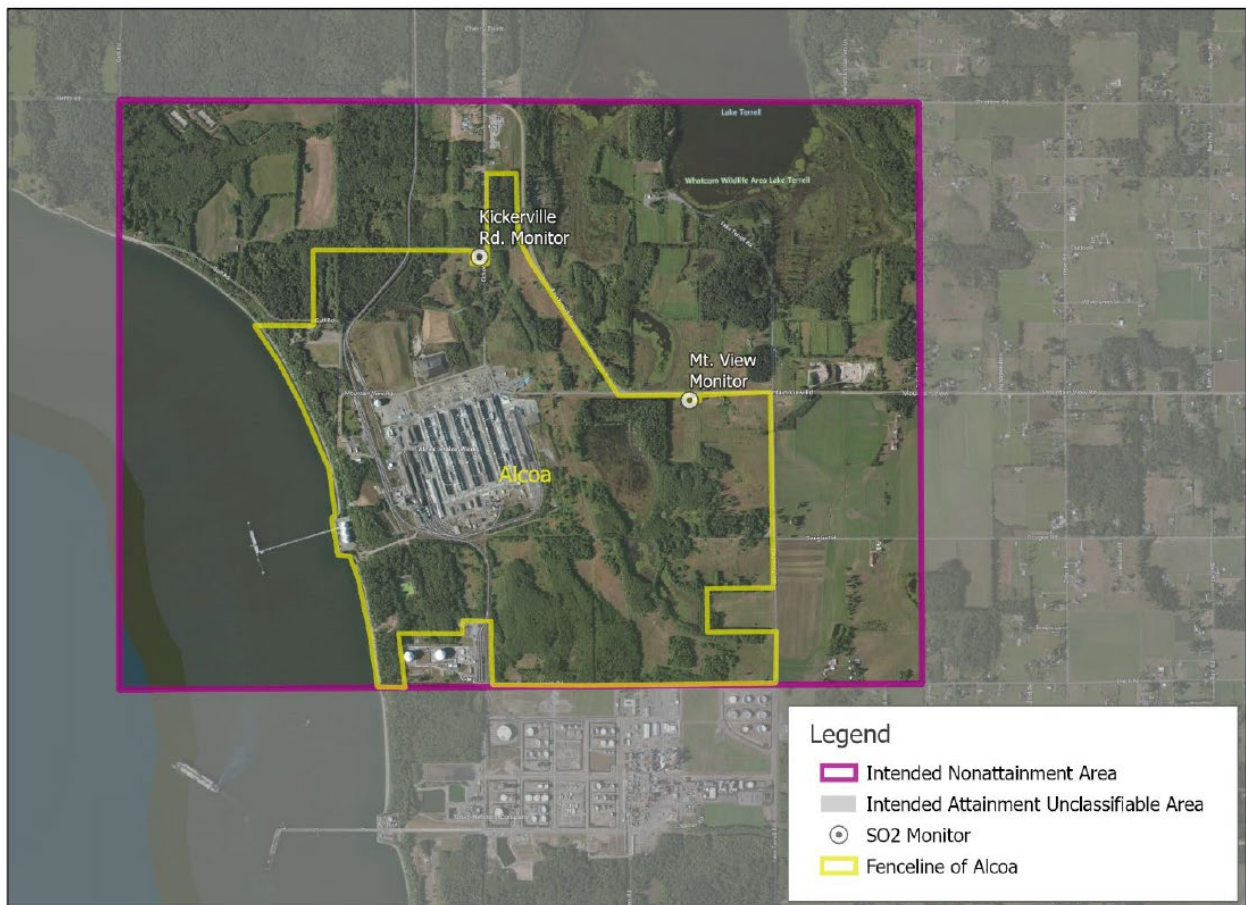


Figure 1: Map of the nonattainment boundary

EXHIBIT B

LOCATION OF NEW SO₂ WET SCRUBBER

Figure 2: Location of the new SO₂ wet scrubber on Center 1.

EXHIBIT C
SO₂ EQUATIONS

Equation 1

$$SO_2 \left(\frac{\text{tons}}{\text{month}} \right) = (E_{\text{Bake Ovens}} + E_{\text{Potlines}} + E_{\text{Natural Gas}}) \times \left(\frac{1 \text{ ton}}{2000 \text{ lbs}} \right)$$

Equation 2

$$E_{\text{Bake Ovens}} = E_{\text{pitch}} + E_{\text{packing coke}}$$

Equation 3

$$E_{\text{pitch}} \left(\frac{\text{lb } SO_2}{\text{month}} \right) = \frac{2.0 \text{ lb } SO_2}{1.0 \text{ lb } S} \times B_a \times (GAW \times ((f_p + (f_p \times f_{gs})) \times f_{s,p}))$$

E_{pitch} = SO₂ evolved from pitch volatilizing during anode baking (pounds per month)

B_a = Number of anode blocks pressed and baked during the month (anodes per month)

GAW = Green anode weight (pounds per anode)

f_p = Fraction of pitch in anode (represented as a decimal)

f_{gs} = Fraction of green scrap in anode (represented as a decimal)

$f_{s,p}$ = Fraction of sulfur in pitch (represented as a decimal)

Equation 4

$$E_{\text{packing coke}} \left(\frac{\text{lb } SO_2}{\text{month}} \right) = f_{s,\text{packing}} \times (BAW \times B_a) \times PCC \times \frac{2.0 \text{ lb } SO_2}{1.0 \text{ lb } S}$$

$E_{\text{packing coke}}$ = SO₂ evolved from packing coke consumed in the bake ovens (pounds per month)

$f_{s,\text{packing}}$ = Fraction of sulfur in packing coke (represented as a decimal)

BAW = Average weight of baked anode (pounds per anode)

B_a = Number of anode blocks pressed and baked during the month (anodes per month)

PCC = 0.015 tons of packing coke consumed per ton of baked anode (typical industry value per 2006 International Aluminum Institute, Aluminum Sector Greenhouse Gas Protocol)

Equation 5

$$E_{\text{Potlines}} \left(\frac{\text{lb } SO_2}{\text{month}} \right) = E_{\text{Unscrubbed}} + E_{\text{Scrubbed}}$$

E_{Potlines} = SO₂ evolved from the consumption of anodes in the potlines (pounds per month)

$E_{\text{Unscrubbed}}$ = SO₂ emissions from Centers without an SO₂ wet scrubber (pounds per month)

E_{Scrubbed} = SO₂ emissions from Centers with an SO₂ wet scrubber (pounds per month)

Equation 6

$$E_{Unscrubbed} = P_{Unscrubbed} \times CCR \times ASC \times SCR \times \frac{2.0 \text{ lb } SO_2}{1.0 \text{ lb } S}$$

$E_{Unscrubbed}$ = SO₂ emissions from Centers without an SO₂ wet scrubber (pounds per month)

$P_{Unscrubbed}$ = Total aluminum production from the half of the potline(s) without an SO₂ wet scrubber during the month (pounds of aluminum per month)

CCR = Average carbon (anode) consumption ratio (pounds of carbon consumed per pound of aluminum produced)

ASC = Anode sulfur content, represented as a decimal (pounds of sulfur released per pound of carbon consumed)

SCR = Sulfur conversion rate to SO₂. Intalco must use a representative SCR. The SCR must be reviewed and approved by Ecology prior to use.

Equation 7

$$E_{Scrubbed} = \sum_{X=1}^6 E_{Scrubbed \text{ Center } X}$$

$E_{Scrubbed}$ = SO₂ emissions from Centers with an SO₂ wet scrubber (pounds per month)

$E_{Scrubbed \text{ Center } X}$ = SO₂ emissions from Center X with an SO₂ wet scrubber where Center X refers to any Center with an SO₂ wet scrubber.

Equation 8

$$E_{Scrubbed \text{ Center } X} = P_{Scrubbed \text{ Center } X} \times CCR \times ASC \times SCR \times \frac{2.0 \text{ lb } SO_2}{1.0 \text{ lb } S} \times (1 - CE_{\text{Center } X})$$

$E_{Scrubbed \text{ Center } X}$ = SO₂ emissions from Center X with an SO₂ wet scrubber (pounds per month) where Center X refers to any Center with an SO₂ wet scrubber

$P_{Scrubbed \text{ Center } X}$ = Total aluminum production from the half of the potline ducted to Center X during the month (pounds of aluminum per month)

CCR = Average carbon (anode) consumption ratio (pounds of carbon consumed per pound of aluminum produced)

ASC = Anode sulfur content, represented as a decimal (pounds of sulfur released per pound of carbon consumed)

SCR = Sulfur conversion rate to SO₂. Intalco must use a representative SCR. The SCR must be reviewed and approved by Ecology prior to use.

$CE_{\text{Center } X}$ = Control efficiency of the wet SO₂ scrubber at Center X. A control efficiency of 85% (0.85) must be used if the wet SO₂ scrubber at Center X is operating continuously during the reporting period. If the wet SO₂ scrubber at Center X is not operating for the entire reporting period, the following equation must be used to determine the average monthly control efficiency.

Equation 9

$$CE_{Center X} = \frac{(0.85 \times \text{hours of Center X scrubber operation})}{\text{Total hours of operation of Potline ducted to Center X}}$$

$CE_{Center X}$ = Control efficiency of the wet SO₂ scrubber at Center X

Hours of Center X scrubber operation = The total hours in the month that the SO₂ wet scrubber at Center X was operating. Center X SO₂ wet scrubber operating time does not include any periods when the Center X SO₂ wet scrubber was not operating properly or malfunctioning.

Total hours of operation of Potline ducted to Center X = Total hours in the month that pots exhausting to Center X with a SO₂ wet scrubber were operating

Equation 10

$$E_{Natural Gas} \left(\frac{lb SO_2}{month} \right) = NG_S \times NG_C \times \frac{2.0 lb SO_2}{1.0 lb S} \times \frac{1 lb}{7000 grains}$$

$E_{Natural Gas}$ = SO₂ evolved from natural gas combustion (pounds per month)

NG_S = Sulfur content of natural gas (grains of sulfur per 100 cubic feet)

NG_C = Natural gas consumed during the month (100 cubic feet per month)

Equation 11

$$E_{Casthouse NG} \left(\frac{lb SO_2}{hour} \right) = NG_S \times NG_{Casthouse} \times \frac{2.0 lb SO_2}{1.0 lb S} \times \frac{1 lb}{7000 grains}$$

$E_{Casthouse NG}$ = SO₂ evolved from natural gas combustion (pounds per hour) in the Casthouse Units

NG_S = Sulfur content of natural gas (grains of sulfur per 100 cubic feet)

$NG_{Casthouse}$ = Maximum hourly natural gas consumption rate at the Casthouse Units (100 cubic feet per hour). The maximum hourly natural gas consumption rate is the sum of natural gas usage for any given hour at Holding Furnaces 1–12, the Remelt Furnace, and the Homogenization Furnace.